

| TABLE 3.1 | | | | |
|--|--------------------------------------|---|---|---|
| SUMMARY OF DATA QUALITY OBJECTIVES (DQO) PROCESS SOIL AND FILL | | | | |
| OU2 RI/FS WORK PLAN | | | | |
| SOUTH DAYTON DUMP AND LANDFILL SITE, MORaine, OHIO | | | | |
| Investigation Phase: | | Phase 1A | Phase 1B | Phase 2 |
| DQO Step | Investigation Item: | Comparison to Residential and Industrial Soil Criteria | Comparison to Background Reference Conditions | Additional sampling (if necessary) to develop risk assessment exposure estimates |
| 1 | <u>State the Problem</u> | | | |
| | i) Problem description | Insufficient soil quality data exist for OU2 in order to determine: - The nature and extent of contaminated soil and fill. - The nature and lateral and vertical extent of the contaminated soil and fill material. | - Insufficient soil quality data exist for OU2 in order to determine whether contaminant concentrations are from historic site activities or are due to elevated background concentrations (either naturally occurring or anthropogenic regional contamination). | If soil or fill containing site-related contaminants of concern (COCs) at concentrations greater than screening values and background reference conditions is found in Phases 1A and 1B for Southern Parcels, there may still be insufficient data to establish the presence or absence of direct contact, ingestion, and inhalation risks to receptors via soil and/or fill exposure pathways. |
| | ii) Planning team | See note at bottom | | |
| | iii) Conceptual model | Fill was placed in a portion of the Southern Parcels. The fill includes but may not be limited to CDD. The fill may contain contaminants. OU2 soil may have site-related contaminants from wind-blown deposition, run-off, groundwater leaching, and/or redepositing of contamination (i.e. regrading). - Contaminants in soil may pose a risk to human receptors via the direct contact, inhalation and ingestion pathways. Cover material at the Site is limited or non-existent, which could lead to erosional run-off of contaminants towards the Quarry Pond, which may pose a risk to human receptors and ecological receptors (e.g. wildlife, aquatic organisms) - Infiltrating precipitation can cause contaminants in soil and fill to migrate downwards, ultimately impacting groundwater. - Groundwater migrating from OU1 could deposit contaminants in the soil and/or fill of OU2. | | |
| | iv) General intended use for data | The soil and fill data collected will be compared to USEPA Residential and Industrial Soil Regional Screening Levels (RSLs) to identify direct contact/ingestion/inhalation human health risks, and compared to USEPA RCRA Ecological Screening Levels (ESLs) (USEPA, 2003) to identify ecological risks associated with soil and fill in OU2. The data collected will ultimately be used in the Remedial Investigation Report and Baseline Risk Assessment for OU2. | The data collected from sampling locations in the Southern Parcels will be compared to background conditions, to determine if there are measurable levels of Site-related contaminants. The data collected will ultimately be used in the Baseline Risk Assessment for OU2. | The collected data will be used to generate exposure estimates for an assessment of direct contact/ingestion/inhalation human health risks and risks to ecological receptors. The data collected will ultimately be used in the Baseline Human Health Risk Assessment and Ecological Risk Assessment for OU2. |
| | v) Resources, constraints, deadlines | Sufficient resources will be committed to sample soil on the Southern Parcels under the OU2 RI/FS work plan. Sampling may be postponed due to flooding. | | |

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| DQO Step | Investigation Phase: | | | |
|----------|--|--|---|---|
| | Investigation Item: | Phase 1A Comparison to Residential and Industrial Soil Criteria | Phase 1B Comparison to Background Reference Conditions | Phase 2 Additional sampling (if necessary) to develop risk assessment exposure estimates |
| 2 | Goals of the Study: | | | |
| | i) Primary study question | Do soil and fill samples from the Southern Parcels contain contaminants at concentrations greater than Industrial or Residential Soil RSLs, or USEPA RCRA ESLs? | Are contaminant concentrations due to Site activities or locally occurring background concentrations? | Does soil or fill in OU2 contain Site-related contaminants that pose unacceptable human health risks or unacceptable risks to ecological receptors? |
| | ii) Alternate outcomes or actions | - If sampling demonstrates that contaminant concentrations in soil and fill are less than RSLs, no further sampling or remedial action is planned. - If sampling demonstrates that contaminant concentrations in soils or fill are greater than screening levels/criteria, further evaluation is needed to determine if the contamination is Site-related, and is a risk to human health and the environment, and/or remedial measures. | - If sampling demonstrates that contaminant concentrations in OU2 are not greater than those found in background reference soils, no further sampling is planned. | - If sampling demonstrates that human health and ecological risks from all combined exposure pathways are acceptable, no further action is required. - If sampling demonstrates unacceptable human health or ecological risks, further evaluation, risk management and/or remediation would be required. |
| | iii) Type of problem (decision or estimation) ¹ | Decision (Action Level) | Decision (Action Level) | Estimation |
| | iv.a) Decision statement | Determine whether any Site-related contaminant concentrations in soil and fill are greater than USEPA Industrial/Residential Soil RSLs, or USEPA RCRA ESLs in OU2. | Determine whether any measurable levels of Site-related contaminants, relative to background reference conditions, occur in soil and fill in OU2. | Determine where contaminant concentrations require further consideration or response action, and where no further investigation is necessary. |
| | iv.b) Estimation statement & assumptions | -- | -- | The parameter of interest is the mean (for estimating direct contact/ingestion/inhalation risks) of soil/fill contaminant concentrations within identified exposure areas in OU2. The exposure areas are defined in Step 7i). The statistical measure of interest is the 95% UCL of the mean for each exposure unit. The size and location of each exposure unit should be identified based on property ownership boundaries and current and reasonably foreseeable activities and land uses. |

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|----------|---|--|---|---|
| | Investigation Item: | Phase 1A Comparison to Residential and Industrial Soil Criteria | Phase 1B Comparison to Background Reference Conditions | Phase 2 Additional sampling (if necessary) to develop risk assessment exposure estimates |
| 3 | <u>Identify Information Inputs:</u> | | | |
| | i) Information types needed | -Identification and chemical analysis of soil and fill in OU2. - Contaminant concentrations in soil and fill in OU2. -Background soil contaminant concentrations. - Soil samples will be collected on a random basis (random oriented grid) from each exposure area. - Soil samples will also be collected at data gap locations or areas of suspected soil contamination. - Exposure areas, determined by current and reasonably foreseeable activities land uses, exposure routes, and property ownership boundaries. | | - Supplemental analyses of soil samples obtained to fill in significant data gaps across the exposure area. - Exposure routes and receptors - Toxicological information on the contaminants of concern. |
| | ii) Information Sources | - Existing soil/fill data - New results from all soil and fill samples collected from OU2, and data on background conditions. - Conceptual site model. | | - New soil/fill data from the Phase 2 investigation - Available validated previous data (e.g., from Phase 1), within the exposure area. |
| | iii) Basis of Action Level | Action Levels are: - USEPA Industrial and Residential Soil RSLs - USEPA RCRA ESLs The data collected will be compared against USEPA Residential and Industrial Soil RSLs to identify human health and ecological risks associated with soil samples from OU2. | | -- |
| | iv) Appropriate sampling & analysis methods | Methods are described in the Field Sampling Plan (CRA, May, 2013) and the Quality Assurance Project Plan (CRA, September 2008). | | |

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|----------|-------------------------------------|---|---|--|
| | Investigation Item: | Comparison to Residential and Industrial Soil Criteria | Comparison to Background Reference Conditions | Additional sampling (if necessary) to develop risk assessment exposure estimates |
| 4 | Define the Boundaries of the Study: | | | |
| | i) Target population, sample units | The initial target population is surficial and subsurface soils on the Southern Parcels. The sampling units are individual samples. | The sampling units are individual samples collected from the soil off-Site (beyond the Southern Parcels). The initial target population of background samples is surficial and subsurface soils from off-Site, near-by properties that have similar soil conditions. | Target population is soil and fill exceeding screening levels and comprising the exposure units for assessment of exposure risks for human receptors. |
| | ii) Specify spatial boundaries | The spatial boundaries are the limits of site-related soil and fill contamination. Surficial soil is to a maximum depth of 2 ft bgs for human health risk purposes, and 3 ft bgs for ecological risk. The spatial boundaries of the sub-surface soil samples for screening human health risks will be to a depth of 15 ft bgs, i.e., the maximum soil depth construction workers would be expected to encounter. There is no predetermined maximum depth for characterizing the extent and magnitude of contamination. [Per the groundwater DQO in Table 3.2, additional unsaturated soil samples will be collected at depths greater than 15 ft bgs to investigate potential leaching threats to groundwater.] Boreholes will be advanced a minimum of 5 ft into native material or until refusal, whichever is encountered first. | Background reference surface and subsurface sampling locations will be identified in areas outside a reasonable zone of potential influence (via surface runoff or substantial airborne dust deposition) for the Site. Distance from the Site and prevailing wind directions will be considered in making this determination. | The spatial boundaries are the limits of OU2, which is everywhere that environmental media have been impacted by Site contaminants outside of OU1. Surficial soil is to a maximum depth of 2 ft bgs for human health risk purposes, and 3 ft bgs for ecological risk. The spatial boundaries of the sub-surface soil samples for screening human health risks will be to a maximum depth of 15 ft bgs, i.e., the maximum soil depth construction workers would be expected to encounter. [Per the groundwater DQO in Table 3.2, the spatial boundaries to evaluate risks to groundwater will be the entire depth of soil above the water table.] |
| | iii) Specify temporal boundaries | The temporal boundaries are indefinite, assuming continued exposure at levels found during sampling. The practical temporal limits are based on the exposure assumptions of the Action Levels. | | |

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| iv) Identify any other practical constraints | Practical constraints anticipated for sampling of OU2 soil and fill include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. Safety issues associated with sampling adjacent to surface water will also be considered for sampling activities on the Quarry Pond Parcels. | If different surficial soil substrates are encountered (e.g., silt vs. sand vs. clay), these differences may require additional sampling (e.g., further reference samples) to appropriately evaluate potential Site-related impacts. Off-Site sampling may be restricted by permission of property owners, and availability of suitable locations for background locations. | Practical constraints anticipated for sampling of Southern Parcels soil include the presence of cars on the Jim City Parcels and buildings and equipment on the Ron Barnett Parcels. Off-Site sampling, if required for delineation purposes, may be restricted by permission of property owners. |
| v.a) Scale of inference for decision making | Comparisons to Action Levels will be carried out on an individual-location basis. | Comparisons to background reference conditions will be carried out on an individual-location basis. | -- |
| v.b) Scale of estimates | | | The scale of the exposure estimate is to be identified in a Site-specific risk assessment. |

5 Develop the Analytic Approach:

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| i.a) Specify Action Level | 1) USEPA Industrial Soil RSLs 2) USEPA Residential Soil RSLs 3) USEPA RCRA ESLs | Background Threshold Values based on background reference data, following USEPA's ProUCL Technical Guide (2013) | -- |
| i.b) Specify estimator | -- | | The arithmetic mean (per USEPA RAGS requirements) surface soil concentration of each contaminant that is greater than screening criteria. |
| ii.a) Specify population parameter of interest and theoretical decision rule | Individual observations at sampling locations on the Southern Parcels. | | -- |
| ii.b) Specify estimation procedure | -- | | The study will estimate the mean concentration of the exposure unit population represented by the soil samples obtained. |

6 Specify
Performance or
Acceptance
Criteria:

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| i.a) Set baseline (null) and alternative hypotheses | Baseline H ₀ : soil sample concentrations are less than Action Levels. Alternative H ₁ : soil samples contain contaminant concentrations greater than Action Levels. | Baseline H ₀ : soil sample concentrations from the Southern Parcels are no different than reference background concentrations Alternative H ₁ : soil samples from the Southern Parcels contain contaminants at concentrations greater than reference conditions. | -- |
| i.b) Specify how uncertainty accounted for in estimate | -- | | Uncertainty will be accounted for using a confidence interval on the population mean (per USEPA RAGS guidance). |
| ii.a) Determine impact of decision errors (false positives/negatives) | N/A: no statistical test is employed (direct comparison to Action Levels) | - If a false positive (Type I) error occurs, unnecessary additional investigation (Phase 2) may occur. - If a false negative (Type II) error occurs, conditions that are not due to background contaminant concentrations and pose potential health risks to receptors persist. | -- |
| ii.b) Specify confidence level for estimate | -- | | The confidence level of the estimate will be 95 percent, unless specified otherwise (based on data distribution and/or the presence of non-detect results) in USEPA's ProUCL Technical Guide (2013). |
| iii) Specify "gray region" for test | N/A: no statistical test is employed (direct comparison to Action Levels) | N/A: since comparing individual concentrations against reference conditions, no statistical test is employed. | -- |

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| iv.a) Set tolerable limits on decision errors | N/A: no statistical test is employed (direct comparison to Action Levels) | The Background Threshold Values will be calculated using a 95 percent confidence level, making the false positive rate no greater than 5 percent. Limits on the false negative rate are not appropriate for comparisons of individual results to threshold values. | -- |
| iv.b) Specify performance or acceptance criteria | -- | | The lesser value of the 95 percent UCL on the population mean or the maximum individual measurement will be required. |

7 Develop the Plan for Obtaining Data:

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| i) Select sampling design | Soil samples from Southern Parcels will be collected from four exposure areas (Jim City Parcels, Ron Barnett Parcels, Quarry Pond Parcel soil, Quarry Pond embankments including Parcel 3275). Exposure areas are determined based on current use and ownership, potential future use, and topography. | Background surface and subsurface reference samples will be collected at 10 locations to provide a suitable data set (per USEPA's ProUCL Technical Guide, 2013) for the calculation of Background Threshold Values. | The number of additional soil samples required, for delineation purposes and removal of data gaps, will be determined based on the results of the Phase 1A and 1B investigations. |
| | Separate sets of data will be collected for (i) surface soil 0-2', (ii) subsurface soil 2-15', and (iii) unsaturated samples from a minimum of 12 locations at depths greater than 15 ft bgs. Additional soil samples will be collected at intervals within boreholes exhibiting evidence of contamination (based on field screening, visual and olfactory observations) A minimum of 8 samples per exposure area, per USEPA's ProUCL Technical Guide (2013), spaced on a regular grid with random origin (i.e., a systematic random sampling design), will be obtained for each exposure area identified in the risk | -- | -- |

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| | assessment. Additional samples will be collected in the areas of any data gaps. Additional samples will be collected from subsurface soil (>15' at 3 locations per exposure area and additional locations) if impacts are identified. | | |
| ii) Specify/evaluate key assumptions supporting the design | The calculation of 95 percent upper confidence limits on a population mean makes assumptions of data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2013). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated. | The calculation of Background Threshold Values (statistical limits on an upper percentile, e.g. 95th) for the reference population of surficial soils depends on data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2013). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated. | The calculation of 95 percent upper confidence limits on a population mean makes assumptions of data characteristics (e.g., distribution and proportion of detected values), as fully discussed in the USEPA ProUCL Technical Guide (2013). Additionally, the presence of outlying values will be tested, and if present their impact on the values obtained evaluated. |

Notes:

- [1] If investigating a "decision problem", follow items ending in ".a" in subsequent DQO steps (e.g., "ii.a" or "iii.a").
If investigating an "estimation problem", follow ".b" items.
Once the baseline risk assessment for OU2 has been performed, possible remedial goals (PRGs) will be derived from the calculator using site-specific risks.

-- Item not applicable for the type of problem (decision vs. estimation) investigated.

The planning team includes:
Respondents: Ken Brown (ITW); Jim Campbell (ITW); Bryan Heath (NCR); Wendell Barner (TRW)
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Paul Wiseman, Rawa Fleisher, Angela Bown (CRA chemists/quality assurance staff);
Julian Hayward, Valerie Chan (CRA project engineers); Mark Hilverda (CRA project hydrogeologist);
Leslie Patterson (USEPA Regional Project Manager); Maddie Smith (Ohio EPA representative); and property owner stakeholders.